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ANSWER KEY & SOLUTION KEY FINAL ROUND - 20 (PCB) Dt.30.04.2024

BOTANY

Section - A (35 Questions)

01. **(2)** [NCERT 11th, Page 247, Point 15.4.1 (Secondparagraph)]
02. **(3)** (NCERT 11th Pg.233, 1st Paragraph, 10th line)
03. **(3)** (NCERT 11th Pg.233, 14.4.2 E.T.S)
04. **(3)** (NCERT 11th P.K. Gymno. conceptual)
05. **(4)** (NCERT 12th Page no.243 1st para)
06. **(3)** (NCERT 11th Page No. 80 ; sub-topic 5.9.2)
07. **(1)** [NCERT 11th, Page 249, Point 15.4.3.2 (Lastparagraph)]
08. **(4)** (NCERT 12th, Pg 83, Para 1)
09. **(2)** (NCERT 11th, Page no- 21, Last paragraph, Line no- 32, 33)
10. **(2)** (NCERT 12th, Pg 112, Table 6.1)
11. **(3)** (NCERT 12th, Pg 108, Para 2, line 2)
12. **(3)** (NCERT 12th, Pg 107, Transcription, Para 2)
13. **(3)** (NCERT 11th para 10.4.1 based / Page no.168,169)
14. **(2)** (NCERT 12th, page no- 36, 3rd paragraph, Line no- 24,25)
15. **(4)** (NCERT 12th, Page no- 29, 1st paragraph, Line no- 12, 13, 14)
16. **(4)** (NCERT 11th para 10.1.1, 10.4 based / Page no.163,168)
17. **(4)** (NCERT 12th, Page no- 28, 1st paragraph, Line no- 15 and 16)
18. **(3)** (NCERT 11th, Page no-11, Table 1.1)
19. **(2)** (NCERT 11th Exemplar Questions)
20. **(3)** (NCERT 11th para 8.5.9 based / Page no.163,137)
21. **(2)** (NCERT 12th, Pg 82, Table 5.3)
22. **(2)** (NCERT 11th, Page no- 19, 3rd Paragraph, Line no- 25, 26, 27, 28)
23. **(3)** [NCERT 11th Page No. 222 3rd paragraph]
24. **(4)** (NCERT 11th page no. 220 – 13.10.1 - concept based, page no. 221, 13.10.2, 2nd paragraph and 13.10.3, 1st paragraph)
25. **(1)** (NCERT 11th Page No. 67; sub-topic 5.1.2)
26. **(4)** (NCERT 12th, Pg 89- Klinefelter's Syndrome)
27. **(3)** (NCERT 12th, Pg 93 (summary))
28. **(2)** (NCERT 12th, Pg 76, Incomplete Dominance, Pg 75- Law of Dominance)
29. **(4)** (NCERT 12th, Pg 117, Based on Figure 6.14 The lac Operon)
30. **(4)** (NCERT 12th, Pg 94)
31. **(2)** [NCERT 11th, Page no. 94, Point- 6.4 (Line no.– 01-03)]
32. **(2)** (1NCERT 11th para 8.5.6 based / Page no136)
33. **(1)** (NCERT 11th para 8.5.8 based / Page no.163,137)
34. **(2)** (NCERT 11th Page no. 35, 2nd para concept based.)
35. **(1)** (NCERT 11th Page no.39, conceptual endosperm is formed from)

SECTION - B (Attempt Any 10 Questions)

36. **(3)** (NCERT 12th, Pg 111, Para 2,3)
37. **(3)** (NCERT 11th; Page No. 75; sub-topic 5.5.1.4)
38. **(3)** (NCERT 11th, Page no- 24, last paragraph, Line no- 33)
39. **(1)** (NCERT 12th, Pg 90- Sickle-cell anaemia, Pg 89- Colour Blidness)
40. **(2)** (NCERT 12th Page no.243 1st para ,14.3)
41. **(4)** (NCERT 11th Page no. Algae to gymnosperm, Concept based.)
42. **(1)** [NCERT 11th, Page no. 93]
43. **(1)** [NCERT 11th, Page 239, Line no. 12)]
44. **(1)** (NCERT 11th Pg.229, 14.4)
45. **(2)** (NCERT 11th, Page no- 16, 1st paragraph, Line no- 5,6,7,8,9)
46. **(3)** (NCERT 12th, Page no-34, 1st paragraph, Line no- 1 and 2)
    (NCERT 12th, Page no- 27, 2nd paragraph, Line no- 18,19)
    (NCERT 12th, Page no-36, Last paragraph, line no- 40,41 and 42)
47. **(2)** (NCERT 11th, Page no- 8, 4th paragraph, Line no- 22, 23)
48. **(2)** (NCERT 11th concept related - page no. 220, point 13.9 and page no. 219, fig. 13.9)
49. **(2)** (NCERT 11th para 8.4.2, 8.5.6 based / Page no.129, 137)

50. **(4)** (NCERT 11th para 10.1.1 based / Page no.164)

ZOOLOGY

Section - A (35 Questions)

51. **(1)** [NCERT 12th No.203 , 1st para, 8th line]
52. **(4)** (NCERT 11th Page. 286)
53. **(1)** (NCERT 11th Page. No. 197)
54. **(2)** (NCERT 12th Page. No. 131)
55. **(1)** (NCERT 12th page no 47, para2)
56. **(1)** (NCERT 12th page no 53, para 3)
57. **(3)** (NCERT 12th page no 51, para1)
58. **(3)** [NCERT 11th P.No.305, 5th Line]
59. **(3)** [NCERT 11th P.No.311, Pectoral Girdle]
60. **(3)** [NCERT 11th P.No.312,Synovial Joints]
61. **(3)** [NCERT 11th P.No.307,1st para , 3rd Line]
62. **(3)** (NCERT 12th Page no.260 fig.15.1)
63. **(3)** (NCERT 12th Page no.218 scientist information)
64. **(2)** (12th NCERT Page no.232 table 13.1 and examples of each interaction.)
65. **(1)** (NCERT 12th page no 58, para3)
66. **(3)** (NCERT 11th page no113, para 1)
67. **(2)** [NCERT 12th P.No.201,2nd Para, Conceptual]
68. **(1)** [NCERT 12th P.No.204 ,Fig: 11.7]
69. **(2)** (NCERT 12th, Page no-134, Figure- 7.7)
70. **(2)** (NCERT 11th, Page no- 148, 1st paragraph, line no- 2,3)
71. **(3)** (NCERT 12th para 10.1 / Page no.181)
72. **(4)** (NCERT 11th; Page. No.184)
73. **(4)** (12th ncert para 10.3 / Page no.185)
74. **(3)** (NCERT 11th, Page no- 146, paragraph-9.3, line no- 4,5)
75. **(2)** (NCERT 11th; Page No. 339, last line of 3rd paragraph)
76. **(4)** (NCERT 11th; Page No. 292, 4th line of 3rd paragraph)
77. **(1)** (NCERT 11th page no117, para 2)
78. **(1)** (NCERT 12th, Page no- 140, last paragraph, Line no- 30, 31, 32)
79. **(4)** (NCERT 11th Page. No. 188)
80. **(4)** (NCERT 12th Page. No. 130)
81. **(1)** (NCERT 12th, Page no- 134, 2nd Paragraph, Conceptual)
82. **(3)** (NCERT 11th; Page No. 59, 60 Class, Aves and Mammals examples)
83. **(3)** (NCERT 11th Page No. 51; last line of phylum ctenophora)
84. **(1)** (NCERT 11th Page No. 52, last 3rd line of Aschelminthes)
85. **(3)** [NCERT 11th P.No.321 ,Midbrain para]

SECTION - B (Attempt Any 10 Questions)

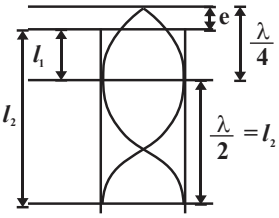
86. **(4)** (NCERT 11th Page. No. 185)
87. **(4)** (NCERT 12th page no 47, para2)
88. **(3)** (NCERT 11th page no 103, para3)
89. **(2)** (NCERT 12th para 10.3 / Page no.185)
90. **(4)** (NCERT 12th Page no. 232 ,table 13.1)
91. **(1)** [NCERT 11th P.No.320 ,Meninges : SubArachnoid Space Applied]
92. **(2)** (NCERT 11th, Page no-158, Paragraph-9.12.5, Line no- 13, 14)
93. **(2)** [NCERT 12th No.201 ,Fig. 11.5]
94. **(1)** (NCERT 12th; Page No. 338, Last Paragraph; 339, 1st Paragraph)
95. **(3)** (NCERT 11th; Page No. 294; functions of renal tubules)
96. **(4)** (NCERT 12th, Page no- 137, 2nd paragraph, Line no- 19, 20, 21, 22)
97. **(4)** (NCERT12th page no 54, 3.7 parturition and lactation)
98. **(1)** (NCERT 12th; Page. No. 130-133)
99. **(4)** [NCERT 11th P.No.310,311]
100. **(2)** (NCERT 12th Page. No.145-146)

PHYSICS

SECTION - A (35 Questions)

101. **(3)** Volume of immersed part remains same. So there is no change in the level of water.

102. **(1)**



$\frac{\lambda}{2} = l_1 - l_1 = 118 - 38 = 80$

$\frac{\lambda}{4} = 40 = e + l_1$

$40 = e + 38$

$e = 2$ cm

103. **(2)** The tension T in the string is $T = 6(g + a)$
$= 6(10 + 1) = 66$ N

104. **(2)** Torque, $t = \frac{dL}{dt}$. When $\tau = 0$,

then $\frac{dL}{dt} = 0$

$\Rightarrow$ L = constant, i.e. L is conserved.

105. **(3)** Rotational kinetic energy,

$$E = \frac{1}{2} I\omega^2 \Rightarrow \omega = \sqrt{\frac{2E}{I}}$$

Now, angular momentum,

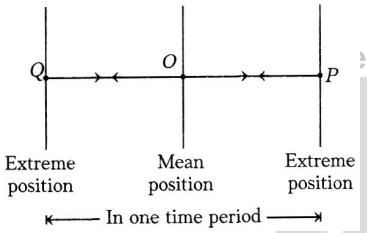
$$L = I\omega = \sqrt{2EI}$$

106. **(2)** The stoping potential (V_0) depends onthe frequency (v) of incident light as :

$$eV_0 = h\nu - \phi_0$$

If $\nu \uparrow$ than $V_0 \uparrow$

107. **(4)** In a simple harmonic motion (SHM), the particle oscillates about its mean position on a straight line. As shown in the figure below, the particle moves from its mean position (O) to an extreme position (P) and then return to its mean position vovering same distnace of A. Then, by the conservative force, it is moved in opposite direction to a point Q by distance A and then back to mean position covering same distance of A. This comprises of one time period as shown below.



Hence, in one time period, it covers a distance of

$$x = OP + PO + OQ + QO$$

$$= A + A + A + A = 4A$$

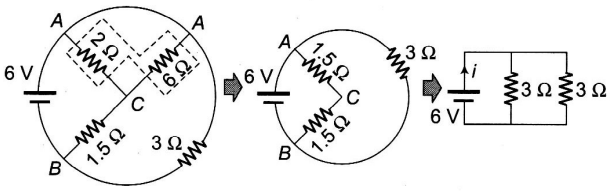
108. **(3)**

109. **(3)** $V_A = V_B = V_C$

$W_A = q(V_A - V_P)$, $W_B = q(V_B - V_P)$, $W_C = q(V_C - V_P)$

$W_A = W_B = W_C$

110. **(3)** Parallel, $\frac{2\times 6}{2+6} = 1.5\,\Omega$



$$R_{eq} = \frac{3}{2}\Omega$$

$$i = \frac{6}{3/2} = 4\,A$$

111. **(1)**

$$r = \frac{\sqrt{2mK}}{Bq}, \quad \frac{R_p}{R_\alpha} = \frac{\sqrt{m}}{e} \cdot \frac{2e}{\sqrt{4m}} = \frac{1}{1}$$

112. **(4)** Due to the same mass of A and B as well as due to elastic collision velocities of spheres get interchanged after the collision.

113. **(2)** Order of slit/obstacle should be comparable to wavelength of wave used.

114. **(2)** $\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)\text{Å}$ $\boxed{\frac{1}{\lambda} \propto Z^2}$

115. **(4)** $C_{eq} = 2\,\mu F$

$Q_{eq} = 4\mu C$

Q on $1\mu F = 2\mu C$

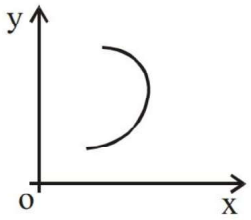
Q on $2\mu F$ each $= 2\mu C$

116. **(3)** As mass number increases on higher atomic mass side binding energy per nucleon decreases.

117. **(4)** On increasing temperature resistivity of semiconductor decreases.

118. **(4)**

119. **(3)**



For a particular displacement, particle can have multiple velocity.

120. **(4)** Average power $P_m = \frac{V_{rms}^2}{R}$

$$P_m = \frac{900}{10}$$

$$P_m = 90\ watt$$

121. **(1)** $\therefore W = q[V_f - V_i]$

For P to Q

$W = 100 \times (-1.6 \times 10^{-19}) \times -14$

$W = 22.4 \times 10^{-17}$ J

122. **(3)** At the instant of projection velocity will be maximum and will be same just before the body hits the earth. But initially power will be negative, whereas the time of hitting it will be positive.

123. **(2)**

For parallel combination

$C_{effective} = C_1 + C_2$

$$\because C_1 = \frac{K_1\varepsilon_0\left[\frac{A}{2}\right]}{d} \& C_2 = \frac{K_2\varepsilon_0\left[\frac{A}{2}\right]}{d}$$

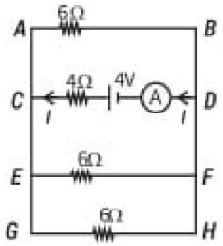
$$C_{effective} = \frac{A\varepsilon_0}{d}\left[\frac{K_1 + K_2}{2}\right] = 1\mu F\left[\frac{4+2}{2}\right]$$

$$C_{effective} = 3\mu F$$

124. **(2)** $\because$ Work function $\phi = \frac{hc}{\lambda}$

$\therefore \frac{\lambda_1}{\lambda_2} = \frac{\phi_2}{\phi_1} = \frac{4.6}{2.3} = 2$

125. **(2)**

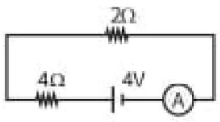


All resistance of $6\,\Omega$ are in parallel

$\therefore$ Effective resistance

So simplified circuit is given given as

$R = \frac{6}{3} = 2\Omega$



$I = \frac{4}{4+2} = \frac{2}{3} A$

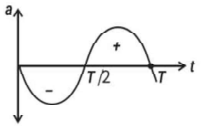
126. **(3)** If $x = A\sin(wt + \phi)$

$v = Aw\cos(wt + \phi)$

$a = -Aw^2\sin(wt + \phi)$

If $\phi = 0$

$a = -Aw^2\sin(wt)$



Net area is zero

127. **(1)** Fact

128. **(2)** Y depends on material only.

129. **(1)** From aphelion to perihelion distance of planet from sun goes on decreasing, speed goes on increasing hence kinetic energy increases

130. **(3)** By equation of continuity

$a_1v_1 = a_2v_2 + a_3v_3$

$1\times 10 = 0.5 \times 6 + 0.2 \times v_3$

$10 = 3.0 + 0.2\ v_3$

$7 = 0.2\ v_3 \qquad \therefore v_3 = \frac{7}{0.2} = 35$ m/s

131. **(1)** Since like charges repel each other.

132. **(2)** When launched with excape velocity then total energy is zero. When launched with velocity less than escape then total energy is negative.

133. **(2)** Emw are transverse in nature.

134. **(1)** Given $X = \frac{A^2B^{1/2}}{C^{1/3}D^3}$

The percentage error in X is given by

$\frac{\Delta X}{X}\times 100 = 2\left(\frac{\Delta A}{A}\right)\times 100 + \frac{1}{2}\left(\frac{\Delta B}{B}\right)\times 100$

$+\frac{1}{3}\left(\frac{\Delta C}{C}\right)\times 100 + 3\left(\frac{\Delta D}{D}\right)\times 100$ ...(I)

Given, $\frac{\Delta A}{A}\times 100 = 1\%, \frac{\Delta B}{B}\times 100 = 2\%$

$\frac{\Delta C}{C}\times 100 = 3\%, \frac{\Delta D}{D}\times 100 = 4\%$

Substituting these values in Eq. (i) we get

$\frac{\Delta X}{X}\times 100 = 2(1\%) + \frac{1}{2}(2\%) + \frac{1}{3}(3\%) + 3(4\%)$

$= 2\% + 1\% + 1\% + 12\% = 16\%$

Thus, maximum % error in X is 16%

135. **(4)** $\because X_L = X_C \Rightarrow$ Resonance

Reading of voltmeter $= V_L - V_C = 0$V

and $i = \frac{V}{r} = \frac{240}{30} = 8A$

SECTION - B (Attempt Any 10 Questions)

136. **(1)** As net force on the system = 0 (after being released)

137. **(4)** i = 0, A = 60°, e = 90°

if i = 0 then $r_1 = 0$

$A = r_1 + r_2$

$A = r_2 = 60°$

$\mu \times \sin r_2 = 1 \times \sin e$

$\mu = \frac{\sin e}{\sin r_2} = \frac{\sin 90^0}{\sin 60^0} = \frac{2}{\sqrt{3}}$

138. **(2)** The given equation is

$y(x,t) = 2\sin\left(\frac{2\pi}{3}x\right)\cos(100\,\pi t)$

It represents a stationary wave. Therefore, all the points between consecutive nodes vibrate with same frequency and same phase but different amplitude.

139. **(4)** For uniform velocity, acceleration is zero. Hence resultant force will be zero.

$\therefore \vec{F}_1 + \vec{F}_2 + \vec{F}_3 = 0$

$(2\hat{i} - 5\hat{j}) + (3\hat{i} - 4\hat{j}) + \vec{F}_3 = 0$

or $\vec{F}_3 = (-5\hat{i} + 9\hat{j})$

140. **(1)** $C_1 = 4\pi\in_0 \frac{rR}{R-r}$

$C_2 = 4\pi\in_0 R$

$C_{eq} = C_1 + C_2$

$$C_{eq} = 4\pi \in_0 \frac{rR}{R-r} + 4\pi \in_0 R$$

$$C_{eq} = 4\pi \in_0 \frac{R^2}{R-r}$$

141. **(2)**

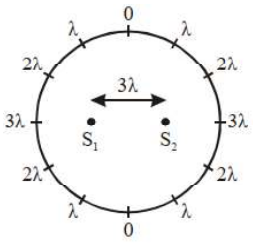
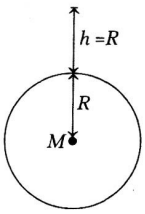


diagram shows Δx at different point on circle
From diagram it is clear that
number of maxima = 12

142. **(2)** As we know, the potential energy of body of mass m on the surface of earth.

$$U_1 = -\frac{GMm}{R} \quad ...(i)$$

where, G = gravitational constant,
M = mass of earth and R = radius of earth.
When the mass is raised to a height h from the surface of the earth, then the potential energy of the body becomes,



$$U_2 = -\frac{GMm}{(R+h)}$$

Here, h = R
(Given)

$$\Rightarrow \quad U_2 = -\frac{GMm}{2R} \quad ...(ii)$$

Thus, the change in potential energy,

$$\Delta U = U_2 - U_1$$

Substituting the values from Eqs. (i) and (ii) , we get

$$\Delta U = -\frac{GMm}{2R} + \frac{GMm}{R}$$

$$= \frac{GMm}{2R} = \frac{gR^2m}{2R}$$

$$\left(\because g = \frac{GM}{R^2}\right)$$

$$= \frac{mgR}{2}$$

Thus, the work done in raising the mass to a height R is equals to $\frac{mgR}{2}$.

143. **(1)** dq = I dt

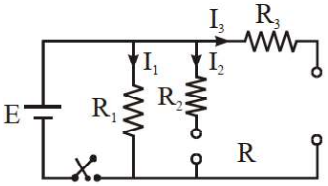
$$q = \int I\,dt = \int_0^2 (3t^2 + 2t + 5)dt$$

$$= \left|t^3 + t^2 + 5t\right|_0^2$$

$$= [(2)^3 + (2)^2 + 5\times 2] - [0]$$

= 22 C

144. **(2)** At t = 0



So $I_1 = \frac{E}{R_1}$

$I_2 = I_3 = 0$

145. **(2)** As distance is same

$$\Rightarrow v_{avg} = \frac{2v_1v_2}{v_1+v_2} \Rightarrow \frac{2\times 60\times 40}{60+40} = 48\,\text{kmph}$$

146. **(4)** It is balanced Wheatstone bridge. So potential difference across the capacitor = 0
So charge stored on capacitor = 0

147. **(4)** Frequency of open organ pipe $(f_n) = \frac{(n+1)v}{2l}$, n^{th} overtone.

Frequency of close organ pipe $(f_n) = \frac{(2n+1)v}{4l}$ n^{th} overton.

$\Rightarrow$ Frequency of 4^{th} overtone of open organ pipe

$$(f) = \frac{5V}{2l}$$

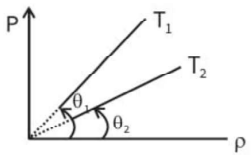
$\Rightarrow$ Frequency of 4th overtone of close organ pipe

$$(f') = \frac{9v}{4l}$$

$$\rightarrow \frac{f}{f'} = \frac{5\times 4}{2\times 9} = \frac{10}{9}$$

148. **(3)** 300 ×1 (25 – T) = 50 × 80 + 50 (T – 0)
T = 10° C

149. **(1)**



$$\text{As } P = \frac{\rho RT}{M} \Rightarrow \frac{P}{\rho} = \tan\theta = \frac{RT}{M}$$

$\therefore \tan\theta \alpha T$

150. **(1)** If $C \rightarrow$ New vector

$\therefore \vec{C} = |\vec{B}|\hat{A}$

$\hat{A}$ is unit vector in the direction **A**

$$\vec{C} = \sqrt{(7)^2 + (24)^2} \times \frac{\vec{A}}{|\vec{A}|^-}$$

$$\vec{C} = \sqrt{625} \times \frac{(3i + 4j)}{\sqrt{3^2 + 4^2}}$$

$$\vec{C} = 25 \times \frac{(3i + 4j)}{5}$$

CHEMISTRY

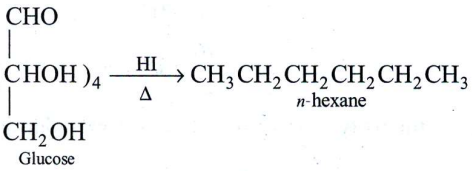
SECTION - A (35 Questions)

151. **(4)** Isotopes differ in physical properties.

152. **(2)** Enthalpy of ionisation = 57.3 – 55.4 = 1.9 kJ

153. **(3)** $n_p < n_r$ and the reaction is exothermic. So high pressure and low temperature favour forward reaction.

154. **(1)** On prolonged heating with HI, glucose forms n-hexane, suggesting that all 6 carbon atoms are linked in a straight chain.



155. **(2)** If both Assertion & Reason are true but the Reason is not the correct explanation of the Assertion

156. **(2)** (A) SF_6 - Octahedral
(B) $SiCl_4$ + Tetrahedral
(C) AsF_5 - Trigonal bipyramidal
(D) BCl_3 - Trigonal planar

157. **(2)** Among the given statements, B, C and D are correct while the statements A and E are incorrect.
Their corrected form are:
• Hybridisation is defined as an intermixing of a set of atomic orbitals of slightly different energies, thereby forming a new set of orbitals having equivalent energies and shapes.
• A hybrid orbital formed from s and p-orbital can contribute to σ -bond only.

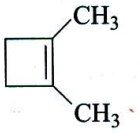
158. **(4)** $Al_2(SO_4)_3 \rightleftharpoons 2Al^{3+} + 3SO_4^{2-}$

$K_{sp} = (2s)^2 (3s)^3 = 4 \times 27s^5 = 108s^5$

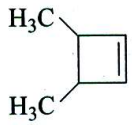
159. **(1)** $MnO_4^- + e^- \rightarrow MnO_4^{-2}$

160. **(3)** The dehydration of tertiary alcohol is faster than the dehydration of the secondary alcohol. Also, the dehydration of the secondary alcohol is faster than the dehydration of primary alcohol.
The alcohol II is more easily dehydrated than the alcohol III as in the alcohol II, the secondary carbocation has 5 alpha hydrogen atoms which is taking part in hyperconjugation while in III, there are only 3 alpha hydrogens.
Thus, the order of dehydration is IV > II > III > I

161. **(2)**



and



IUPAC name
1, 2-dimethylcyclobut-1-ene

IUPAC name
3, 4-dimethylcyclobut-1-ene

162. **(2)** (b)

163. **(2)** Since dissimilar halogens are combined in interhalogen compounds hence the bond between them (X–X' bond) is weaker than homoatomic halogen (X – X or X' – X' bonds).

164. **(3)** $\overset{+4}{S}O_2 + 2H_2\overset{-2}{S} \rightarrow 3\overset{0}{S} + 2H_2O$

SO_2 is acting as oxidising agent.
Equivalent mass of

$$SO_2 = \frac{\text{Molecular weight}}{\text{Change in oxidation number}} = \frac{64}{4} = 16$$

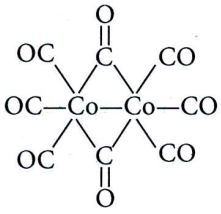
165. **(4)** For ideal solution, $\Delta H_{mix} = 0$.

166. **(3)** The correct option is only (3).
The correct statement for rest options are
(1) ortho-nitrophenol is more volatile than para-nitrophenol due to presence of intramolecular H-bonding.
(2) ortho-nitrophenol has less boiling point than para-nitrophenol.
(4) They do not have same volatitly, ortho-nitrophenol > para-nitrophenol.

167. **(2)** The correct answer is (2) A-III, B-IV, C-II, D-I

168. **(3)** Fullerenes have smooth structures without dangling bonds. It contains twenty, six-membered rings and twelve, five-membered rings.

169. **(4)** The structure of $[Co_2(CO)_8]$ is



Terminal CO = 6
Bridged CO = 2

170. **(2)** $Fe^{2+} + 2e^- \longrightarrow Fe$; $E_{Fe} = \frac{56}{2} = 28$

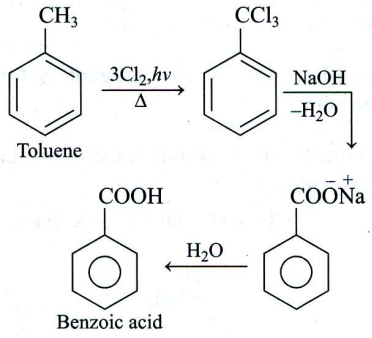
$w_{Fe} = E_{Fe} \times$ Number of Faraday $= 28 \times 3 = 84$ g

171. **(3)** From 1st reading rate $= 10.0 \times 10^{-5} = k[0.003]^n$
(where, n is order of reaction)
From 2nd reading rate $= 5.0 \times 10^{-5} = k[0.006]^n$
On dividing (i) by (ii),

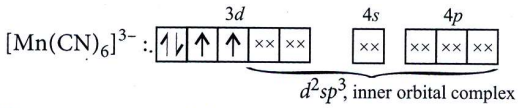
$$\frac{10.0\times10^{-5}}{5.0\times10^{-5}} = \frac{k[0.003]^n}{k[0.006]^n} \Rightarrow 2 = \left(\frac{1}{2}\right)^n \Rightarrow n = -1$$

172. **(1)** $(CH_3)_3CCHCl_2$

173. **(4)** The complete reaction can be written as



174. **(1)** In $[Mn(CN)_6]^{3-}$, oxidation state of Mn = +3,
$Mn^{3+} = 3d^4$



It has two unpaired electrons.

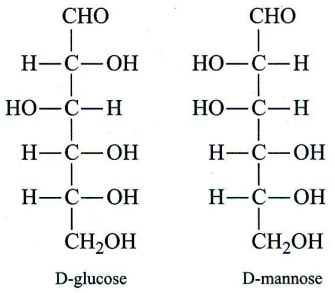
$\mu = \sqrt{n(n+2)} = \sqrt{2(2+2)} = \sqrt{8} = 2.82$ B.M.

175. **(3)** 95% of a lanthanoid metal, 5% of iron and traces of S, C, Ca and Al.

176. **(2)** The correct match is A-IV, B-III, C-I, D-II

177. **(2)** A is true but R is false. The correct form of R is: The rate constant of a zero order reaction does not depend on time.

178. **(2)** Statement I is true as D-mannose and D-glucose differ at configuration at C-2 only. Hence, they are epimers.
The structure of D-mannose and D-glucose are as follows



Statement-II is also true as two or more polypeptide chains may associate to give rise to the quatenary structure.
These are held together by non-covalent forces such as hydrogen bonds, electrostatic interactions and van der Waals's interaactions.

179. **(4)** Statement I is true but Statement II is false

180. **(4)** Let molar mass be M.
Mass of 21 carbon atoms = 252

$$\% \text{ of carbon} = \frac{252\times100}{M} = 69.98 \Rightarrow M = 360.1$$

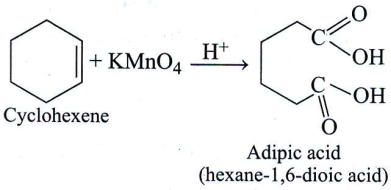
181. **(4)** Meq. of HCl = 5 × 1 = 5;
Meq. of HBr = 20 × (1/2) = 10;
Meq. of HNO_3 = 30 × (1/3) = 10;
Thus, total Meq. of acid = 5 + 10 + 10 = 25
Total volume = 1000 mL

Also Meq. = N × V $\quad \therefore \; N = \frac{25}{1000} = \frac{1}{40}$

182. **(1)** The third line from the red end corresponds to yellow colour as shown below. Hence, $n_2 = 5$.
Violet, Indigo, Blue, Green, Yellow, Orange, Red, (third colour from red is yellow).
Thus inter-orbit jump of electron will be from 5 to less than 5.

183. **(4)** Lassaigne's test is a general test for the detection of halogens, nitrogen and sulphur in an organic compound. These elements are covalently bonded to the organic compounds. In order to detect them, these have to be converted into their ionic forms. This is done by fusing the organic compound with sodium metal.

184. **(4)** Acidified $KMnO_4$ oxidizes cyclohexene to adipic acid, i.e. hexane-1, 6-dioic acid.



185. **(2)** 'a' represents covalent radius which is one-half of the distance between the nuclei of two bonded atoms. 'b' represents van der Waals' radius which is one-half of the distance between nuclei of two closest molecules.

SECTION - B (Attempt Any 10 Questions)

186. **(1)** At 25°C products of combustion are $CO_2(g)$ and $H_2O(l)$.

187. **(2)** Cl^- ions are oxidised more easily than H_2O.

188. **(1)** The decreasing order for reactivity towards S_N1 reaction is IV > I > III > II.

The carbocation formed from II is secondary carbocation are not resonance stabilised. Hence, it is least stable and least likely to be formed.

The carbocation formed from III is tertiary carbocation and are not resonance stabilised. But, it is more stable then II and more likely to be formed.

The carbocation formed from I is secondary carbocation and resonance stabilised by one phenyl ring.

Hence, it is most stable and most likely to be formed.

The carbocation formed from IV is tertiary carbocation and resonance stabilised by one phenyl ring.

Hence, it is more stable than I.

189. **(4)**

190. **(2)** $2Cu^{2+} + 4I^- \longrightarrow 2CuI_2$

The CuI_2 immediately decomposes to liberate I_2 and insoluble copper(I) iodide.

$2CuI_2 \longrightarrow 2CuI + I_2$.

191. **(1)** Violet

192. **(3)** $k = \frac{1}{t}\ln\frac{r_\infty - r_0}{r_\infty - r_t}$

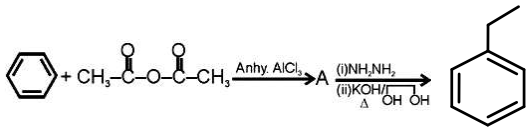
193. **(1)** Among the given statements, A and C are incorrect while B, D and E are correct. The correct form of Statement A and C are:

A. Starch sol is an intrinsic colloid and can be prepared by warming with suitable solvent (water).

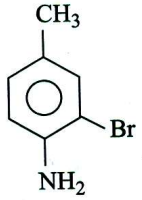
C. Arsenious sulphide sol can be prepared by the double decomposition reaction.

$As_2O_3 + H_2S \rightarrow As_2S_3 + 3H_2O$

194. **(3)**



195. **(2)**



196. **(1)** Velocity $= \frac{\text{Distance}}{\text{Time}}$

To complete one revolution in the Bohr's orbit,

distance $= 2\pi r$ also $mvr = \frac{nh}{2\pi} \Rightarrow v = \frac{nh}{2\pi\ mr}$

Substituting values of distance and velocity in (i),

we get $\text{Time} = \frac{2\pi r}{nh/2\pi\ mr} = \frac{4\pi^2 mr^2}{nh}$.

197. **(3)** In an aprotic solvent, the increasing order for the nucleophilicity of the halide ions is

iodide < bromide < chloride < flouride.

A polar aprotic solvent does not form hydrogen bond with nucleophiles to a significant extent, meaning that the nucleophiles have greater freedom in solution.

Under these conditions, nucleophilicity correlates well with basicity and fluoride ion, being the most unstable of the halide ions, reacts fastest with electrophiles.

198. **(2)** Aromatic aldehydes and formaldehydes don't contain α – hydrogen and thus undergo Cannizzaro reaction. Formaldehyde is more reactive than aromatic aldehyde in nucleophillic addition reactions. This is due to electron -donating resonance effect of aromatic ring which makes carbon less electrophillic.

199. **(2)** Intramolecular hydrogen bonds are formed within the same molecule.

200. **(2)**